

Patent Claims

1. Plasma radiation source which emits radiation proceeding from a source region in a vacuum chamber at a defined solid angle through a gas curtain that is provided for debris suppression along an axis of the mean direction of propagation of the radiation, characterized in that the gas curtain, as a radially directed supersonic gas jet (7), proceeds from a propulsion nozzle (2) of a gas jet vacuum pump (3), which propulsion nozzle (2) is arranged on the axis (X-X) of the mean propagation direction of the radiation (5), is directed to an annular mixing nozzle (8) of the gas jet vacuum pump (3) arranged coaxial to the axis (X-X), and is guided out of the vacuum chamber (1) by a diffuser (10).
2. Plasma radiation source according to claim 1, characterized in that a discharge is used for plasma excitation and an electrode arrangement with anodes (11) and cathodes (12) arranged next to one another along the axis (X-X) of the mean propagation direction of the radiation (5) is provided for the discharge.
3. Plasma radiation source according to claim 2, characterized in that liquid metal electrodes are used as electrodes.
4. Plasma radiation source according to claim 3, characterized in that the liquid metal electrode has a carrier (16) which is penetrated by a supply channel (17) for a liquid emitter (18) and which is coated at its end facing the plasma (4) with a high-melting porous material (19) into which the supply channel (17) opens.
5. Plasma radiation source according to claim 3 or 4, characterized in that the liquid metal electrode is outfitted with a heating device.
6. Plasma radiation source according to claim 4 or 5, characterized in that the carrier (16) and the porous material (19) are electrically conductive.
7. Plasma radiation source according to claim 4 or 5, characterized in that the carrier (16) and the porous material (19) are not electrically conductive.
8. Plasma radiation source according to claim 6 or 7, characterized in that the carrier (16) and the porous material (19) are chemically identical.
9. Plasma radiation source according to one of claims 2 to 8, characterized in that a pinch effect generated by the current flow along the axis (X-X) is additionally supported by an external magnetic field around the plasma (4).

10. Plasma radiation source according to claim 9, characterized in that the external magnetic field is formed as a static magnetic field.

11. Plasma radiation source according to claim 9, characterized in that the external magnetic field is adapted to the current flow through the plasma (4).

12. Plasma radiation source according to claim 1, characterized in that laser radiation is used to excite plasma.

13. Plasma radiation source according to one of claims 1 to 12, characterized in that a reflector is provided adjacent to a source region (B) for the plasma (4) along the axis (X-X) of the mean propagation direction of the radiation (5), which reflector refocuses the radiation (5) through the plasma (4).

14. Plasma radiation source according to one of claims 1 to 12, characterized in that the gas curtain is adjacent to the source region (B) along the axis (X-X) of the mean propagation direction of the radiation (5) exclusively on the side of an application region (A).

15. Plasma radiation source according to claim 13, characterized in that the gas curtain is adjacent to the source region (B) along the axis (X-X) of the mean propagation direction of the radiation (5) on both sides.

16. Arrangement for generating a gas curtain as a filter for particles in radiation whose mean propagation direction extends in a vacuum chamber along an axis directed through the gas curtain, characterized in that a gas jet vacuum pump (3) with a propulsion nozzle (2) arranged on the axis (X-X) serves to generate a supersonic gas jet (7) for the gas curtain and directs the supersonic gas jet (7) radially to an annular mixing nozzle (8) of the gas jet vacuum pump (3), which mixing nozzle (8) is arranged coaxial to the axis (X-X), and in that a diffuser (10) is provided for guiding the supersonic gas jet (7) out of the vacuum chamber (1).

17. Gas jet vacuum pump with an annular mixing nozzle (8) whose gas inlet opening faces the annular center, a propulsion nozzle (2) arranged in the annular center for generating a supersonic gas jet (7) that proceeds radially from the propulsion nozzle (2) and is directed to the gas inlet opening, and an annular diffuser (10) which works so as to be directed away from the annular center.